REMARKS

INTRODUCTION:

In accordance with the foregoing, claims 1-8, 18-28, and 41-48 have been canceled without prejudice or disclaimer, claims 9, 11, 13, 14, 17, 29, 31, 32, 39, 49, 51, 53, 54, and 57 have been amended, and claims 58-63 have been added.

No new matter is being presented, and approval and entry of the foregoing amendments and new claims are respectfully requested.

Claims 9-17, 29-40, and 49-63 are pending and under consideration. Reconsideration is requested.

OBJECTION TO THE TITLE:

In the Office Action at page 2, the Examiner objects to the title as not being descriptive. In view of the proposed amended title set forth above, the outstanding objection to the title should be resolved. However, if the Examiner continues to believe that the title is not sufficiently descriptive, it is respectfully requested that the Examiner suggest such a title believed to be more suitable.

REJECTION UNDER 35 U.S.C. §102:

In the Office Action at pages 4-5, the Examiner rejects claims 9, 10, 29-31, 49 and 50 under 35 U.S.C. §102(b) in view of Eastman et al. (U.S. Patent No. 5,446,716). This rejection is respectfully traversed and reconsideration is requested.

By way of review, Eastman et al. discloses a recording system including an optical source 11 which generates an optical write signal to be recorded on an optical recording medium 14 such as a recordable CD. A reflected write signal is received by a mark formation effectiveness (MFE) signal generator 23 which generates an MFE signal. Using a signal combiner 34, the MFE signal is compared with a target value stored in a memory 36 to generate an MFE error signal. A feedback loop 50 uses the MFE error signal to control a power of the optical source 11. Using this technique, partial correction is provided for high frequency degradations, such as AC defocus. The complete correction including correction for low frequency degradations, such as DC defocus, is provided. The high frequency degradations can also be caused by shock and vibration, as well as tilt. (Col. 4, lines 15-36 & lines 64-67, col. 5, lines 41-65; col. 8, lines 49-66, col. 9, lines 6-14; FIGs. 1 and 3(a) through 3(c)). However, while Eastman et al. discloses that the system is effective for the optical source 11 having longer wavelengths for use with CDs, Eastman et al. does not suggest that such a system is effective

for systems using shorter wavelengths.

In contrast, claim 9 recites "detecting the defocus of the optical recording medium using a light beam having a wavelength of roughly 430 nm or less." As such, it is respectfully submitted that Eastman et al. does not disclose the invention recited in claim 9.

Further, while Eastman et al. discloses adjusting a write power of the optical source 11, the system disclosed in Eastman et al. does not disclose changing a length or a width of a recording mark recorded on the CD, or that a write time of a write pulse is affected by the MFE error signal.

In contrast, claim 29 recites "a recording compensator which compensates a recording pulse with respect to the detected tilt and defocus using a predetermined scheme to adjust a length and a width of a recording mark according to the detected tilt and/or defocus." In addition, claim 31 recites "said recording compensator adjusts a power and a time required for recording the recording pulse with respect to the detected tilt." As such, it is respectfully submitted that Eastman et al. does not disclose the invention recited in claims 29 and 31, and similarly recited in claim 49.

Claims 10, 30, and 50 are deemed patentable due at least to their depending from corresponding claims 9, 29, and 49.

REJECTION UNDER 35 U.S.C. §103:

A. Rejection of claims 11-13, 17, 32, 39, 40, 51-53, and 57

In the Office Action at pages 5-8, the Examiner rejects claims 11-13, 17, 32, 39, 40, 51-53, and 57 under 35 U.S.C. §103 in view of Eastman et al. and Itakura et al. (U.S. Patent No. 5,978,332). The rejection is respectfully traversed and reconsideration is requested.

On page 6 of the Office Actions, the Examiner notes that Eastman et al. does not disclose compensating a detected tilt, and asserts that Itakura et al. discloses detecting and compensating for the detected tilt. By way of review, Itakura et al. discloses detecting a tilt using a tilt correction unit 16. However, Itakura et al. discloses compensating for the tilt using an actuator 14. (Col. 5, lines 26-37; FIG. 19 of Itakura et al.) The actuator 14 is disclosed as moving a spindle or a carriage in order to compensate for the tilt. (Col. 1, lines 27-34 of Itakura et al.) In addition, Itakura et al. suggests using tilt correction using the actuator 14 and the tilt correction unit 16 as this system is less complicated than conventional systems used with longer wavelength light, and is useful in short wavelength systems which use lenses with high numerical apertures (NAs). (Col. 1, lines 42-59 of Itakura et al.) There is no disclosure or suggestion in Itakura et al. that tilt correction is performed by adjusting a write pulse of a light

source used to write data to a recording medium, or that such adjusting the write pulse would be useful in compensating for tilt instead of utilizing the actuator 14.

In contrast, claim 11 recites "detecting the tilt of the optical recording medium," and compensating a write time of the write pulse with respect to the detected tilt." Since Eastman et al. does not disclose or suggest such a feature, it is respectfully submitted that the combination of Eastman et al. and Itakura et al. does not disclose or suggest the invention recited in claim 11, and similarly recited in claim 51.

In addition, while Itakura et al. discloses the tilt correcting circuit 16 used to correct a tilt, there is no disclosure that the tilt correcting circuit 16 utilizes a memory storing data to perform the tilt correction. In addition, neither Itakura et al. nor Eastman et al. disclose compensating for tilt using a write time and a write power, or by adjusting a size of a recording mark.

In contrast, claim 17 recites "adaptively compensating the recording pattern with respect to the detected tilt and/or defocus using a memory." Claim 17 further recites that the memory stores data comprising, among other data elements, data regarding "a power and a time required for recording to compensate for an amount of shift of the recording pattern," and data regarding "a power and a time required for recording to compensate for a length and a width of recording mark with respect to a detected tilt and/or a length of a recording mark." As such, it is respectfully submitted that the combination of Eastman et al. and Itakura et al. does not disclose or suggest the invention recited in claim 17, and similarly recited in claim 39.

Similarly, it is respectfully submitted that the combination of Eastman et al. and Itakura et al. does not disclose or suggest that "said recording compensator adjusts a write power with respect to the detected defocus, and generates the recording pulse earlier to compensate for an amount of shift with respect to the detected tilt, and adjusts a power and/or a time of the shifted recording pulse to compensate the length and the width of the recording mark" as recited in claim 32, and similarly recited in claim 57.

Claims 12-14, 40, 52, and 53 are deemed patentable due at least to their depending from corresponding claims 11, 39, and 51.

B. Rejection of claims 14-16, 33-38, and 54-56

In the Office Action at pages 8-9, the Examiner rejects claims 14-16, 33-38, and 54-56 under 35 U.S.C. §103 in view of Eastman et al., Itakura et al., and Shoji et al. (U.S. Patent No. 6,175,541). The rejection is respectfully traversed and reconsideration is requested.

On page 8 of the Office Action, the Examiner asserts that col. 2, line 66 to col. 3, line 67 and col. 4, lines 3-20 of Shoji et al. discloses adjusting a write time to compensate a width of the

recording mark. By way of review, Shoji et al. discloses a recording method which allows for a more precise definition of a start and stop of a recording mark. As shown in FIG. 2, a first pattern signal 201 is output with mark parts 209, 211, 213, 215, 217, and 219 having specific lengths of 3T, 6T, and 7T, which correspond to lengths of each corresponding recording mark 204. The pattern signal 201 also has space marks 210, 212, 214, 216, 218, and 220, which are to be spaces on the disc. The first pattern signal 201 is translated into pulse sequences 202 and 203 having specific pulse widths which denote the lengths of 3T, 6T, and 7T. In this way, the length of the recording mark 204 is controlled to be 3T, 6T or 7T by adjusting the widths of the pulses 202, 203 so as to more precisely start and stop the marks 204 and provide for high density recording. (Col. 10, lines 43-61, col. 11, lines 23-28 & 50-63, and FIGs. 1 through 3 of Shoji et al.) However, while this system is disclosed as being used for recording data and varying lengths of recording marks 204 as shown in FIG. 2, Shoji et al. does not disclose or suggest varying a width of the recording marks 204.

Further, Shoji et al. does not suggest that varying of the recording mark 204 lengths and/or widths would be useful in compensating for tilt and/or defocus errors.

In contrast, among other elements, claim 14 recites that "the adjusting the power comprises adjusting a write power to compensate a length of the recording mark," and "the adjusting the write time comprises adjusting the write time to compensate a width of the recording mark." Since Eastman et al. and Itakura et al. do not disclose such a feature, it is respectfully submitted that the combination of Eastman et al., Itakura et al., and Shoji et al. does not disclose or suggest the invention recited in claim 14, and similarly recited in claims 33 and 54.

Similarly, it is respectfully submitted that the combination of Eastman et al., Itakura et al., and Shoji et al. does not disclose or suggest that "said recording compensator both adjusts the power by adjusting a write power to compensate the length of the recording mark, and adjusts a power of a multi-pulse chain of recording pattern to compensate the width of the recording mark" as recited in claim 35, and similarly recited in claim 56.

Claims 15-16, 34, and 55 are deemed patentable due at least to their depending from corresponding claims 14, 33, and 54.

C. Rejection of claims 36-39

On page 10 of the Office Action, the Examiner rejects claims 36-39 under 35 U.S.C. §103 in view of Eastman et al., Itakura et al., Shoji et al., and by asserting that the variations in wavelengths, substrate thicknesses, numerical apertures are the result of routine experimentation not providing new or unexpected results. The rejection is respectfully traversed

and reconsideration is requested.

As an initial point of clarification, it is noted that the variations in wavelengths, substrate thicknesses, and numerical apertures can have a dramatic effect on tilt and defocus. The Examiner's attention is directed to FIGs. 1-7, which show the differences which occur due to changes in wavelength and numerical aperture, as well as differences in the sensitivities of systems with regard to compensating for tilt and defocus after such changes are made. Further, Itakura et al. also discusses the difficulties encountered due to a change in the wavelengths and how the scheme for detecting and compensating for tilt needs to be changed as the wavelength shortens. (Col. 1, lines 20-52 of Itakura et al.) As such, the Examiner's statement appears to contradict both statements in the prior art as well as evidence in the specification as to the effect of changes in wavelength, numerical aperture, and substrate thicknesses on system design.

Further, since the Examiner appears to be taking Official Notice of the combinations of wavelengths, numerical apertures, and/or substrate thicknesses when used in an apparatus as recited in claims 36-38, it appears that the Examiner is taking Official Notice that such a combination exists and is suggested in the prior art. By taking Official Notice, the rejection is being based, in part, on the personal knowledge of the Examiner. The personal knowledge of the Examiner, when used as a basis for a rejection, must be supported by an affidavit as to the specifics of the facts of that knowledge when called for by the applicant. See, MPEP 2144.03, 37 C.F.R. § 1.104(d)(2). In short, the rules of the U.S. Patent and Trademark Office require that the Examiner must either support this assertion with an Affidavit, or withdraw the rejection. Therefore, it is further respectfully requested that the Examiner support the rejection with either an affidavit or a reference, or withdraw the rejection.

Lastly, even assuming arguendo that the Examiner's statement is correct, it is respectfully submitted that the Examiner's statement does not cure the above noted defects of Eastman et al. as applied to claim 29, from which claims 36-38 depend.

ATTACHMENT:

Attached hereto is a "Version With Markings to Show Changes Made," comprising a marked-up version of changes made to the Title and Claims by the current amendment.

PATENTABILITY OF NEW CLAIMS:

Claims 58-63 are deemed patentable due at least to their depending from corresponding claims 11, 17, 49, and 57.

CONCLUSION:

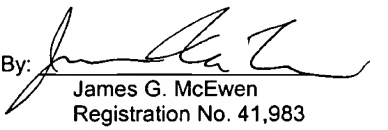
In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. And further, it is respectfully submitted that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any additional fees associated with the filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

By: 
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VERSION WITH MARKING TO SHOW CHANGES MADE

IN THE TITLE:

Please **AMEND** the title, as follows:

--APPARATUS AND METHOD OF COMPENSATING FOR TILT AND/OR DEFOCUS OF A DISC DURING RECORDING --

IN THE CLAIMS:

Please **CANCEL** claims 1-8, 18-28, and 41-48 without prejudice or disclaimer, **ADD** claims 58-63, and **AMEND** claims 9, 11, 13, 14, 17, 29, 31, 32, 39, 49, 51, 53, 54, and 57, as follows. The remaining claims are reprinted, as a convenience to the Examiner, as they presently stand before the U.S. Patent and Trademark Office.

1-8. (CANCELLED)

9. (ONCE AMENDED) A method for compensating for defocus of an optical recording medium, the method comprising:

detecting the defocus of the optical recording medium using a light beam having a wavelength of roughly 430 nm or less; and

compensating a recording signal with respect to the detected defocus using a predetermined scheme.

10. (NOT AMENDED) The method of claim 9, wherein the predetermined scheme comprises adjusting a power level required for recording the recording signal.

11. (ONCE AMENDED) A method of compensating for a tilt and a defocus of an optical recording medium, the method comprising:

detecting the defocus of the optical recording medium;

compensating a write pulse with respect to the detected defocus using a predetermined scheme, wherein the write pulse comprises a predetermined recording pattern;

detecting the tilt of the optical recording medium; and

compensating a write time of the write pulse with respect to the detected tilt.

12. (NOT AMENDED) The method of claim 11, wherein the predetermined scheme comprises adjusting a power level with respect to the detected defocus.

13. (ONCE AMENDED)The method of claim 11, wherein compensating the write pulse with respect to the detected tilt further comprises:

shifting the recording pattern with respect to the detected tilt by both an amount that the recording pattern was shifted due to the detected tilt, and in a direction opposite to the direction that the recording pattern was shifted due to the detected tilt; and

adjusting a power and[/or a] the write time required for recording with respect to the detected tilt in order to compensate for a size of a recording mark corresponding to the recording signal.

14. (ONCE AMENDED)The method of claim 13, wherein

the adjusting the power comprises adjusting a write power to compensate a length of the recording mark, and

the adjusting the write time comprises adjusting [a] the write time to compensate a width of the recording mark.

15. (NOT AMENDED) The method of claim 14, wherein adjusting the recording mark width comprises adjusting an ending time of a first pulse and/or a starting time of a last pulse of the recording pattern.

16. (NOT AMENDED)The method of claim 13, wherein the adjusting the power comprises

adjusting a write power to compensate a length of the recording mark, and

adjusting a write power of a multi-pulse chain of the recording pattern to adjust a width of the recording mark.

17. (ONCE AMENDED) A method for compensating input data for a tilt and/or a defocus of an optical recording medium, which records marks and spaces by write pulses having a predetermined recording pattern, the method comprising:

detecting the tilt and[/or] the defocus of the optical recording medium; and

adaptively compensating the recording pattern with respect to the detected tilt and/or defocus using a memory, wherein the memory [storing] stores data comprising

a write power to compensate with respect to the detected defocus,

a power and[/or] a time required for recording to compensate for an amount of shift of the recording pattern, and

a power and[/or] a time required for recording to compensate for a length and a width of recording mark with respect to a detected tilt and/or a length of a recording mark.

18-28. (CANCELLED)

29. (ONCE AMENDED) An apparatus which records and/or reproduces information on an optical recording medium, and which compensates for tilt and/or defocus, the apparatus comprising:

a tilt and/or defocus detector which detects the tilt and[/or] the defocus of the optical recording medium; and

a recording compensator which compensates a recording pulse with respect to the detected tilt and[/or] defocus using a predetermined scheme[;] to adjust a length and a width of a recording mark according to the detected tilt and/or defocus,

wherein the recording pulse comprises a predetermined recording pattern.

30. (NOT AMENDED) The apparatus of claim 29, wherein, according to the predetermined scheme, said recording compensator adjusts a power level required for recording the recording pulse with respect to the detected defocus.

31. (ONCE AMENDED) The apparatus of claim 29, wherein, according to the predetermined scheme, said recording compensator adjusts a power and[/or] a time required for recording the recording pulse with respect to the detected tilt.

32. (ONCE AMENDED) The apparatus of claim 29, wherein said recording compensator adjusts a write power with respect to the detected defocus, and generates the recording pulse earlier to compensate for an amount of shift with respect to the detected tilt, and adjusts a power and/or a time of the shifted recording pulse to compensate [a] the length and [a] the width of [a] the recording mark.

33. (NOT AMENDED) The apparatus for compensating of claim 32, wherein said recording compensator adjusts the power required for recording to compensate the length of the

recording mark, and adjusts the time required for recording in order to compensate the width of the recording mark.

34. (NOT AMENDED) The apparatus of claim 33, wherein said recording compensator adjusts the power by adjusting a write power to compensate the length of the recording mark, and adjusts the time by adjusting an ending time of a first pulse and/or a starting time of a last pulse to compensate the width of the recording mark.

35. (NOT AMENDED) The apparatus of claim 32, wherein said recording compensator both adjusts the power by adjusting a write power to compensate the length of the recording mark, and adjusts a power of a multi-pulse chain of recording pattern to compensate the width of the recording mark.

36. (NOT AMENDED) The apparatus of claim 29, further comprising a luminance source which provides the recording pulse, wherein a wavelength of the luminance source is equal to or less than approximately 430 nm.

37. (NOT AMENDED) The apparatus of claim 29, further comprising an objective lens having a numerical aperture greater than or equal to 0.6, and wherein the optical recording medium further comprises a substrate having a thickness greater than or equal to 0.3 mm.

38. (NOT AMENDED) The apparatus of claim 29, further comprising an objective lens having a numerical aperture greater than or equal to 0.7, and wherein the optical recording medium further comprises a substrate having a thickness less than or equal to 0.3 mm.

39. (ONCE AMENDED) An apparatus, which records marks and spaces by write pulses having a predetermined recording pattern, and which compensates input data for tilt and/or defocus of an optical recording medium, the apparatus comprising:

a tilt and[/or] defocus detector which detects the tilt and[/or] defocus of the optical recording medium; [and]

a tilt and[/or] defocus compensator which adaptively compensates the recording pattern with respect to the detected tilt and[/or] defocus[, further comprising]; and

a memory storing data comprising

a write power to compensate with respect to the detected defocus,

a power and[/or] time required for recording in order to compensate an amount of shift of the recording pattern, and

a power and[/or] time required to compensate a length and a width of a recording mark with respect to the detected tilt and/or length of the recording mark.

40. (NOT AMENDED) The apparatus of claim 39, wherein the data stored in the memory comprises

a power and/or time and an amount of shift required for recording to compensate when defocus and tilt occur together, and

a power and/or time and an amount of shift required for recording to compensate when defocus or tilt occurs.

41-48. (CANCELLED)

49. (ONCE AMENDED) A computer readable medium storing a computer program having instructions which, when executed by a processor, cause the processor to perform a method, the method comprising:

detecting a defocus of an optical recording medium;

detecting a tilt of the optical recording medium; and

adaptively compensating a length and a width of a recording signal with respect to the detected defocus and tilt using a predetermined scheme stored in a memory.

50. (NOT AMENDED) The computer readable medium of claim 49, wherein the predetermined scheme comprises adjusting a power level required for recording the recording signal.

51. (ONCE AMENDED) A computer readable medium storing a computer program having instructions which, when executed by a processor, cause the processor to perform a method, the method comprising:

detecting a defocus of an optical recording medium;

adaptively compensating a write pulse with respect to the detected defocus using a predetermined scheme stored in a memory;

detecting a tilt of the optical recording medium; and

adaptively compensating a write time of the write pulse with respect to the detected tilt using the predetermined scheme.

52. (NOT AMENDED) The computer readable medium of claim 51, wherein the predetermined scheme comprises adjusting a power level with respect to the detected defocus.

53. (ONCE AMENDED) The computer readable medium of claim 51, wherein compensating the write pulse with respect to the detected tilt further comprises:

shifting a recording pattern within the write pulse with respect to the detected tilt by both an amount that the recording pattern was shifted due to the detected tilt, and in a direction opposite to the direction that the recording pattern was shifted due to the detected tilt; and

adjusting a power and[/or] [a] the write time required for recording with respect to the detected tilt in order to compensate for a size of a recording mark corresponding to the recording signal.

54. (ONCE AMENDED) The computer readable medium of claim 53, wherein

the adjusting the power comprises adjusting a write power to compensate a length of the recording mark, and

the adjusting the write time comprises adjusting [a] the write time to compensate a width of the recording mark.

55. (NOT AMENDED) The computer readable medium of claim 54, wherein adjusting the recording mark width comprises adjusting an ending time of a first pulse or a starting time of a last pulse of the recording pattern.

56. (NOT AMENDED) The computer readable medium of claim 53, wherein the adjusting the power comprises

adjusting a write power to compensate a length of the recording mark, and

adjusting a write power of a multi-pulse chain of the recording pattern to adjust a width of the recording mark.

57. (ONCE AMENDED) A method of compensating for defocus and/or tilt of an optical recording medium, the, method comprising:

detecting a defocus of an optical recording medium;

compensating a write pulse with respect to the detected defocus using a predetermined scheme;

detecting a tilt of the optical recording medium; and

compensating the write pulse with respect to the detected tilt so as to adjust a length and a width of a recording mark in accordance with the detected tilt.

58. (NEW) The method of claim 11, wherein the detected defocus and the detected tilt are detected using a light beam having a wavelength of roughly 430 nm or less.

59. (NEW) The method of claim 17, wherein the detected defocus and the detected tilt are detected using a light beam having a wavelength of roughly 430 nm or less.

60. (NEW) The computer readable medium of claim 49, wherein the predetermined scheme comprises adjusting a write time required for recording the recording signal.

61. (NEW) The computer readable medium of claim 49, wherein the detected defocus and the detected tilt are detected using a light beam having a wavelength of roughly 430 nm or less.

62. (NEW) The method of claim 57, wherein the compensating the write pulse with respect to the detected tilt comprises adjusting a write time required for recording the write pulse.

63. (NEW) The method of claim 57, wherein the detected defocus and the detected tilt are detected using a light beam having a wavelength of roughly 430 nm or less.